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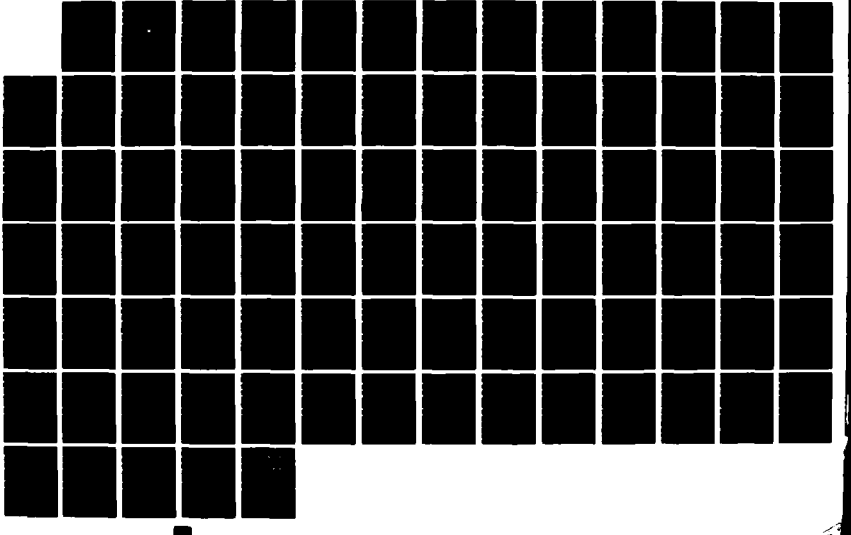

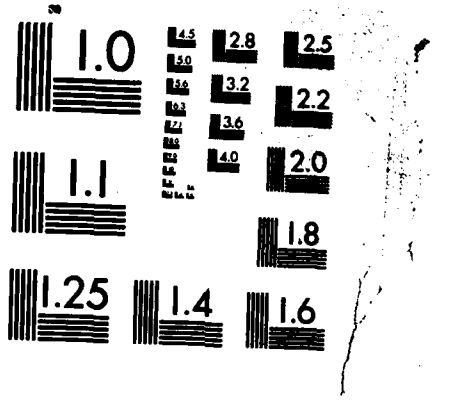

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DOCUMENTATION AND ANALYSIS OF RATE DEVELOPMENT AND COST ACCUMULATION AT NAVAL AIR REWORK FACILITY NORFOLK

by

John W. Orrison

December 1985

Thesis Advisors: S. Ansari
K.J. Euske

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Documentation and Analysis of Rate Development
and Cost Accumulation at
Naval Air Rework Facility Norfolk

by

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Lieutenant Commander, United States Navy
B.S., Purdue University, 1973

Submitted in partial fulfillment of the
requirements for the degree of

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LIST OF ACRONYMS

ADP	-	Automated Data Processing
AIRLANT	-	Commander, Naval Air, Atlantic Fleet
AOR	-	Accumulated Operating Results
ASW	-	Anti-Submarine Warfare
CAS	-	Cost Accounting Standards
CASB	-	Cost Accounting Standards Board
CNO	-	Chief of Naval Operations
DOD	-	Department of Defense
EAMP	-	Engines Analytical Maintenance Program
FRSM	-	Fleet Readiness Support Meeting
FY	-	Fiscal Year
G&A	-	General and Administrative (Overhead)
GSE	-	Ground Support Equipment
JON	-	Job Order Number
MDR	-	Master Data Record
NALC	-	Naval Air Logistics Command
NARDAC	-	Naval Regional Data Automation Center
NARF	-	Naval Air Rework Facility
NAVAIR	-	Naval Air Systems Command
NAVCOMPT	-	Naval Comptroller
NIF	-	Naval Industrial Fund
OASD	-	Office of the Assistant Secretary of Defense
O&M,N	-	Operations and Maintenance, Navy (Budget)

OT	-	Overtime
SDAE	-	Source Data Automation Equipment
SDLM	-	Standard Depot Level Maintenance
ST	-	Straight Time
UCA	-	Uniform Cost Accounting
V/STOL	-	Vertical/Short Take Off and Landing

I. PROBLEM DEFINITION

A. PURPOSE

The purpose of this thesis is to define and compare the methods used for rate development for budeting and stabilized rate billing purposes and the actual cost accumulation/Uniform Cost Accounting System [Ref. 1] as used in the Naval Aviation depot level maintenance system to accepted cost accounting practices as identified in the accounting literature and the Cost Accounting Standards and Regulations. There is a recognized discrepancy in the depot accounting system involving non-matching rates used for budgeting, billing purposes, cost accumulation and reporting. This thesis attempts to explain these differences by an examination of the actual methods used at the Norfolk Naval Air Rework Facility.

B. BACKGROUND

The Uniform Cost Accounting (UCA) System and the Cost Accounting Standards and Regulations on which the system is based mandate that a "contractor's cost accounting practices used in accumulating and reporting actual costs for a contract shall be consistent with his practices used in estimating costs in pricing the related proposal" [Ref. 2]. Therefore there should be a relationship between billing rate (based on a cost reimbursable or zero profit/loss system), actual cost accumulated and actual cost reported. Under a cost reimbursable

or zero profit/loss system, the billing rate should equal the actual cost of the contract upon completion and that cost should equal that which is reported to higher authority (under the UCA reporting system). However examination of previous studies suggests that this may not be the case. [Refs. 3,4]

Research for this thesis began with the proposition that the cause for the discrepancies noted were inherent to the system due to differences in the reporting requirements and regulations within the various accounting systems used at the NARF. The research was conducted as a field study which consisted of two trips to the Naval Air Rework Facility located at the Naval Air Station, Norfolk, Virginia. Five days of interviews were conducted with Comptroller Department personnel. All data, material and conclusions were drawn from interviews and material provided by the interviewees. Other research included searches of the NAVCOMPT Manual [Ref. 5] and accounting literature describing the accepted accounting principles on which the comparisons are made.

This thesis attempts to explain the methods of rate determination and use of those rates in various accounting programs. It begins by discussing the mission, organization and capabilities of NARF, Norfolk. Next it explains in detail the methods used in rate determination at the facility. Chapter IV explains the uses of these rates for budgeting and billing purposes and the actual cost accumulation system in place at the NARF. Both Chapters III and IV include an analysis of

the accepted accounting principles relating to the material discussed and a comparison of these with what the depot is actually doing. Chapter V is an analysis of the causes of the differences in the numbers observed as budgeting and billing rates and the actual costs accumulated and reported. This is accomplished by tracking an actual rate through its life cycle over several fiscal years and giving possible explanations for differences observed, based on the rate determination process. Chapter VI discusses the major findings of this research and suggests some areas for future study.

This study is merely one part of a larger ongoing study to evaluate depot level cost reporting to the Office of the Assistant Secretary of Defense (OASD).

II. BACKGROUND INFORMATION

A. SCOPE AND MANAGEMENT OF NAVAL AIR REWORK FACILITY MAINTENANCE

The purpose of this section is to discuss the structure of the Naval Air Rework Facilities (NARFs), how they are organized within the Navy and specifically how NARF Norfolk fits into the Navy's overall maintenance program and command structure. The information for both this section and the next was received from the NARF Norfolk Organization Manual and during a command briefing as part of an interview conducted with the Material/Management Services Officer at NARF Norfolk. [Refs. 6,7]

With the recent elimination of the Naval Material Command (NAVMAT), the NARFs' chain of command has been shortened. The Chief of Naval Operations still delegates the operation and command of the NARFs to the Commander, Naval Air Systems Command (NAVAIR). This command now directly delegates responsibility for depot-level maintenance of its aircraft to the Commander, Naval Air Logistics Command (NALC). NALC is the echelon commander above the Commanding Officers of the Naval Air Rework Facilities and as such directs the activities, operations and schedules of the NARF. This chain of command is depicted in Exhibit 2-1.

The Naval Aviation depot level maintenance system contains six Naval Air Rework Facilities located throughout the

NAVAL AIR REWORK FACILITY
CHAIN OF COMMAND

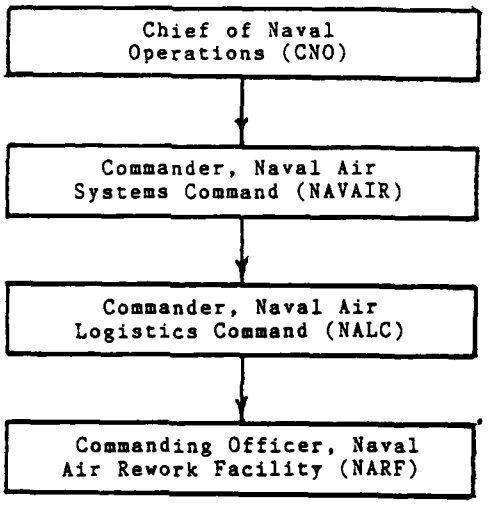

Exhibit 2-1

Source: Reference 6

continental United States. The six NARFs and their functions are as follows.

1. Naval Air Rework Facility Norfolk

Located at the Naval Air Station, Norfolk, Virginia, this depot's major maintenance functions include the rework and Scheduled Depot Level Maintenance (SDLM) of the F-14 "Tomcat" fighter aircraft and the A-6 "Intruder" attack aircraft. NARF Norfolk is the focus of this research and is discussed throughout this thesis.

2. Naval Air Rework Facility Cherry Point

Located at the Marine Corps Air Station, Cherry Point, North Carolina, this depot's major maintenance functions include the rework and SDLM of the AV-8 "Harrier" V/STOL aircraft, F-4 "Phantom" fighter/attack aircraft, OV-10 "Bronco" turboprop aircraft, and the H-46 helicopter. Engines reworked at this installation include the T58, J79, T76, T400 and F402.

3. Naval Air Rework Facility Jacksonville

Located at the Naval Air Station, Jacksonville, Florida, this depot's major maintenance functions include the rework and SDLM of the A-7 "Corsair" attack aircraft and the P-3 "Orion" Anti-Submarine Warfare (ASW) aircraft. Engines reworked at this depot include the J52, TF34 and TF41.

4. Naval Air Rework Facility Pensacola

Located at the Naval Air Station, Pensacola, Florida, this depot's major maintenance functions include the rework and SDLM of the A-4 "Skyhawk" attack and trainer aircraft, the H-3 helicopter, and the H-53 helicopter.

5. Naval Air Rework Facility North Island

Located at the Naval Air Station, North Island, California, this depot's major maintenance functions include the rework and SDLM of the F-14, the F-4, the E-2 "Hawkeye" early warning surveillance aircraft, the A/F-18 attack/fighter aircraft, and the H-46 helicopter. Engines reworked here include the F404, J79, T58, LM15, LM25, and T64.

6. Naval Air Rework Facility Alameda

Located at the Naval Air Station, Alameda, California, this depot's major maintenance functions include the rework and SDLM of the KA-3 and EA-3 "Skywarrior" tanker/electronic surveillance aircraft, A-6/EA-6 attack/electronic warfare aircraft, the P-3 Anti-Submarine Warfare (ASW) aircraft, and the S-3 ASW aircraft. Engines repaired here include the 501, TF34, J52, and T56.

B. NAVAL AIR REWORK FACILITY NORFOLK

1. General Description

NARF Norfolk is located at NAS Norfolk, Virginia, and has a total of 94 buildings situated on 172 acres of land. There are more than twenty-four million square feet of enclosed working and storage space assigned to the depot. The plant contains equipment with a value of $119,118,000. NARF Norfolk employs about 4850 civilians with billets for twenty-seven military personnel, thirteen officers and fourteen enlisted personnel.

The total costs accumulated for Fiscal Year 1984 were:

LABOR	$118,000,000
MATERIALS	150,000,000
CONTRACTURAL SERVICES	46,000,000
TOTAL	$314,000,000

Total costs accumulated for Fiscal Year 1985 (through 31 May, 1985) were $222,739,744 on a FY-to-Date Operating Budget of $263,000,000. Labor, material, and contractural services figures support a $105,242,000 contribution by NARF Norfolk to the Tidewater, Virginia local economy in FY1984.

2. Activities and Services

NARF Norfolk runs a total of four major programs which comprise approximately 74.3% of the total direct labor hours worked at the depot. The other 25.7% of the hours are categorized as "Other Support" and consist of labor done by the Emergency Response Team and the various Fleet Response programs, including the Engineering Support Program, Ground Support Equipment (GSE), Field Repair Teams, Calibration, Customer Serivce, Preservation, Fleet Training, and Manufacturing. The four major programs and some statistics of each, follow.

a. Aircraft Program

This program utilizes about 29.5% of the total direct labor hours and consists of Standard Depot Level Maintenance, Modification Subprograms and repair of the F-14A and A-6 aircraft. The average quarterly induction under this program consists of 17 side numbers.

b. Engines Program

Approximately 20.9% of the direct labor hours of the NARF are spent in this program which includes the Engines Analytical Maintenance Program (EAMP) and major repair of the TF-30, J-57, and T-56 jet and turbofan engines. The average quarterly induction under this program is 130 engines.

c. Components Program

This program utilizes more than 23.6% of the direct labor hours. NARF Norfolk is the designated overhaul facility for 23,000 different items and has a quarterly production of 9700 units.

d. Missiles Program

Only about 0.3% of the direct labor hours are used in this program which includes the AIM-9 Sidewinder modification program with an average quarterly induction of 86 missiles.

These programs are further broken down into subprograms. Specific functions are broken out of the subprograms and job orders represent the final breakdown from the function level.

3. Organization

NARF Norfolk is organized in an hierarchial fashion with four military officers supervising seven major departments which are further broken down into a number of divisions (Exhibit 2-2). A brief discussion of the organization's departments follows.

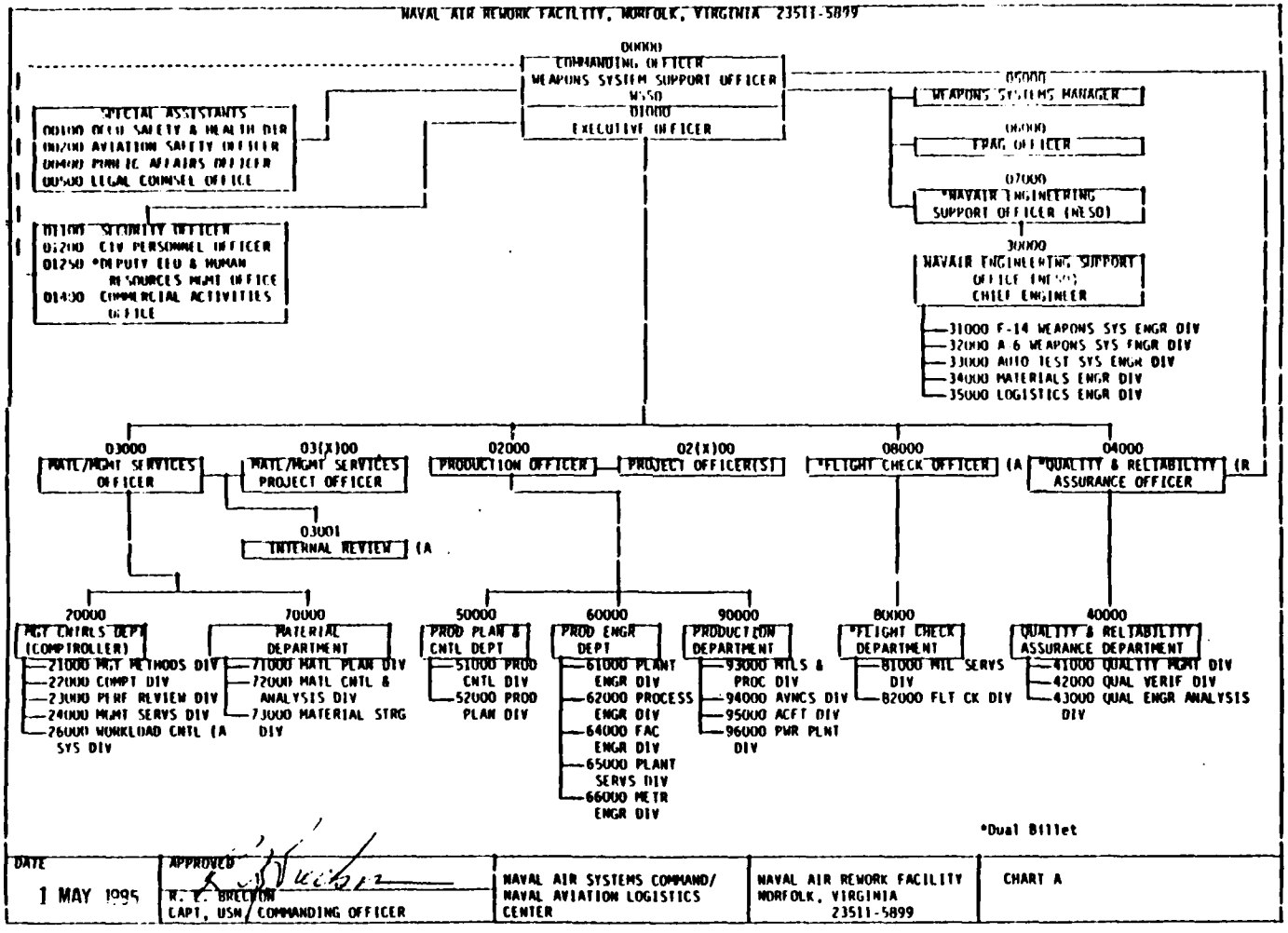

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Exhibit 2-2

Source: Reference 7

a. Management Controls Department

This is the comptroller department of the depot and includes a Management Methods Division, the Comptroller Division, Performance Review Division, Management Services Division and Workload Control Division. The Management Methods Division is the Management Information Systems Division and as such functions as an Automated Data Processing (ADP) Center providing support for management, production control, and administration. It also supplies various other management information data to all NARF departments and is the liaison with the Naval Regional Data Automation Center (NARDAC).

b. Material Department

This department consists of the Material Planning Division, the Material Control and Analysis Division and the Material Storage Division. The department is responsible for developing and maintaining material support for all of the facility production programs.

c. Production Planning and Control Department

The Production Control Division and the Production Planning Division make up this department. Its primary functions are workload scheduling and the control, planning and coordinating of that schedule. It tracks and acts on delays in work-in-progress throughout the plant. The Plans and Programs and Workload Control branches of the Production Planning Division participate in the Fleet Readiness Support Meetings (FRSMs) at the Naval Air Logistics Center (NALC) to negotiate

command workload. They coordinate with the Budget Branch of the Management Controls Department to prepare workload schedules and labor norms for inclusion in rate development and budget preparation.

d. Production Engineering and Production Departments

The actual production engineering divisions and centers that are the heartbeat of the depot maintenance program are in these two departments that make up the rest of the Production Officer's work centers. The Production Engineering Department provides the mechanical, electrical, tooling and industrial engineering services for the facility. The Production Department accomplishes the work that is scheduled for the depot.

e. Flight Check Department and Quality Assurance and Reliability Departments

These two departments function as the quality check arm of the NARF. The Quality Assurance and Reliability Department conducts tests on the procured materials and performs inspections on both in-work items and finished job orders to accept or reject the products based on prescribed quality standards. The Flight Check Department conducts the in-flight checks on the finished products and exercises administrative control over the military personnel program of the facility.

III. RATE DEVELOPMENT

A. INTRODUCTION

Chapter III explains the theory of rate development as well as outlining the actual method which NARF Norfolk uses for development. The techniques used in developing rates at NARF Norfolk are identical whether the rate is to be used internally, externally, for billing purposes or for budgeting purposes. Rate development at the depot can be divided into three distinct segments, Direct Labor, Direct Materials, and Overhead. Overhead includes indirect labor, indirect materials and normal factory overhead such as services, utilities. Actual examples of rates developed at the facility are included for clarification of the discussion.

B. DIRECT LABOR RATE DEVELOPMENT

1. Accepted Accounting Practice

Direct labor rate development is usually based on labor standards (norms) which are developed by product engineers and the result of time studies, historical data and efficiency studies. The standards set by the engineers are not easy to develop, since they are often the compromise of serious disputes between labor unions and management. The pace at which an observed person is working in a time study is noted and referred to as a rating or performance rating. The rating factor is then applied to a task and the result is a normal

time (norm). This implies that the norm is the amount of time a person working at a normal pace can accomplish the task. The standard is in time units (e.g., hours, minutes) and is used as the base for direct labor hours in the labor rate development. [Refs. 8,9,10]

For each type of labor involved in the task for which the rate is being developed, the hours must be translated into dollar values. Established labor rates as agreed upon in labor contracts are normally used. If it appears that the rate may change prior to or during the life of the task at hand, then the new rate should be used. The rate developed should reflect the latest [illegible] rates available at the time of development. The final rate then can be expressed in any form desired such as an average hourly rate, a fixed unit price or any mixture of unit price and variable rate. These rates can be used to predict billing prices, for budgeting or for forecasting costs. [Refs. 8,9,...]

2. Labor Rate Development at [illegible]

a. Introduction

Labor rate [illegible] is the responsibility of the [illegible] Division and comes under the [illegible] Budget Branch Supervisor. The [illegible] Budget Analysts who share the [illegible] with other responsibilities [illegible] is based upon information received [illegible] with

the Budget Analyst who does the rate development for both direct labor and direct materials for the Engines Program at NARF Norfolk. He is also the senior analyst in the rate development field at the NARF and oversees most of the labor and materials rate development at the facility. [Ref. 11]

Exhibit 3-1 is an example of the fiscal year 1986 Engines program labor rate that was developed in early calendar 1985. The following discussion refers to this figure.

Item (1) in Exhibit 3-1 is the quarter to be used for the historical base. It is carefully selected to be the most recent with no known aberrations for labor. For example a Budget Analyst would not normally use the first quarter for rate development since this quarter includes the Christmas leave period and is normally selected for any pay raises for wage grade government employees. The second quarter likewise is seldom used since salaried government employees have been receiving their salary increases in this quarter. As a result, the third or fourth quarter is usually used by default. Therefore, if a rate is being developed near the end of the third quarter or the beginning of the fourth quarter of a fiscal year, the historical base may be nearly a year old.

b. Wage Rates (Item (11), Exhibit 3-1)

This section explains the methods that the Budget Analyst uses to update the historical base to reflect known or forecasted changes. Items (2)-(4) of Exhibit 3-1 illustrate the following calculations. The Budget Analyst in the Budget

FY86 ENGINE LABOR RATE DEVELOPMENT

(1) Historical Base (Fourth Quarter FY84 Actuals):
(From NIF 620 dated 30 September 1984)

		Straight Time	OverTime
(2)	Labor Cost:	$2,654,407.58	$734,449.59
(3)	Labor Hours:	208,179.91	42,548.48
(4)	Base Rate:	12.7505	17.2615

Manipulations for Known or Forecasted Changes:

(5)	Deaccelerated 1.325 ST/1.825 OT:	9.6230	9.4584
(6)	Increased 4% (10/84 pay raise):	10.0079	9.8367
(7)	12 cent wage growth (FY85):	10.1279	9.9567
(8)	Increased 3.37% (10/85 raise):	10.4692	10.2922
(9)	12 cent wage growth (FY86):	10.5892	10.4122
(10)	Decreased 3.75% (5% cut)*:	10.2089	10.0383
(11)	Reaccelerated 1.347 ST/1.847 OT:	13.7513	18.5407

Composite:

		Workload Hours**	X	Rate	=	Labor Cost
(13)	ST:	935,116	X	$13.7513	=	$12,859,061.00
(14)	OT:	60,786	X	18.5407	=	1,127,015.00
(15)	Total:	995,902				$13,986,076.00

(16) Total Cost / Total Hours = $13,986,076.00 / 995,902 = $14.0436 Composite Rate

Rounded to the nearest cent = $14.04 for the labor rate reported in the latest funding budget for the Engine Program.

* Since the pay cut of 5% does not take place until 1/1/86, only a fraction of the cut is factored in, according to the number of workdays affected (3.725%)

** Provided by Code 52020 (Run dated 31 March 1985)

Exhibit 3-1

Source: Reference 11

Branch can begin to develop the rates for the final analysis. The NARF internal management control reporting system within the financial departments at the depot consists of a series of reports that are developed at NARDAC from data received from NARF. These reports are referred to as "NIF" (Naval Industrial Fund) reports and are normally referred to by their numbers. The NIF 620, 627 and 332 reports contain the historical labor costs and labor hours to be used as the base quarter reference. The straight time and overtime historical costs are divided by the straight time and overtime hours to arrive at a historical base rate for both straight time and overtime. This rate includes the acceleration that was originally placed on the labor costs to cover employee leave and fringe benefits. The analyst can look up this acceleration factor for the time period of the historical data and then can "deaccelerate" the rate by dividing the original straight time and overtime rates by the acceleration factors (different for straight time and overtime) used in the original computation (Item (5), Exhibit 3-1).

The two rates are then increased or decreased for either known or forecasted changes from the historical base quarter to the period for which the rate is being developed (Items (6), (8), and (10), Exhibit 3-1). Items (7) and (9) of Exhibit 3-1 show a "wage growth" being added for each fiscal year between these periods to account for increased maturity of wage levels in the workers' wage base. This "wage

growth" is currently 12 cents per fiscal year and is based only on historical and "traditional" factors. This 12 cents per year could be changed at any time by NALC or if recommended by auditors but has been the same for as long as the rate developer for engines has been at the facility. The final wage rate is then "reaccelerated" with the current acceleration factors for the period being forecasted (Item (11), Exhibit 3-1).

c. Labor Norms

The Budget Branch receives the labor norms from Workload Planning and Control (Code 52020) (Item (12), Exhibit 3-1). The labor norms are worked up by Workload Planning and Control using historical data, time studies and directed man-hours that are the result of the Fleet Readiness Support Meetings (FRSM's) and based on the numbers of workers on board and projected for the future. The total workload is taken into account at the FRSM and is factored into the labor norm to aid in breaking out straight time and overtime. These norms are in constant revision and must be reevaluated at least once every two years in accordance with DOD INST 7220.29-H. Workload Planning and Control extensively uses local reports of historical costs and manhours (NIF Reports 627 and 332) to establish both straight time and overtime norms for specific tasks required by the program, function or job for which the rate is being developed.

"NIF 627" is a NARF internal report which sorts historical costs by manhours, labor, production overhead,

General and Administrative overhead, material costs, and "other" costs. "Other" costs include such items as contractual costs incurred outside of the NARF labor force. "NIF 332" is a NARF internal report which breaks out overtime by Job Order Number (JON) and sorts it by shop, manhours and labor costs. NIF 627 is a weekly report which is cumulative on a month-ending basis over the quarter. NIF 332 is a monthly report which is cumulative over the quarter. Workload Planning and Control relies heavily on these reports and can combine them to figure straight time and overtime to any depth (Program, Subprogram, Function, Job). NIF 620 summarizes these two reports at the Program and Subprogram level. This report is advantageous because it has both straight time and overtime on the same report. It is normally used to develop rates at the Program level for budgeting purposes. The data for these reports are accumulated through the actual cost accumulation system which is explained in Chapter IV.

The labor hours can be broken down to any level that the particular rate being developed calls for. They can be broken down to a "skill level" which is a level that encompasses all the work done by personnel with a certain capability. Each program may have any number of skill levels associated with it. For instance the GSE (Ground Service Equipment) Program has six skill levels but the Aircraft Program uses only one. Items (12) through (15) of Exhibit 3-1 use cumulative workload hours based on the labor norms for

projects projected for FY86 received from Code 52020 to figure a total cost for both straight time and overtime.

d. Composite Rates

These two resulting amounts (Items (13) and (14), Exhibit 3-1) are added together to get a Total Labor Cost which is then divided by the Total (straight time + overtime) Hours, resulting in the final Composite Rate which can be reported in the various budgets and/or billing processes as the breakeven composite Direct Labor Rate (Item (16), Exhibit 3-1).

3. Comparison of NARF Labor Rate Development to Accepted Accounting Practices

It is accepted accounting practice to use labor norms that are developed based upon historical data, engineering time studies and efficiency studies [Refs. 8,9,10]. The Workload Planning and Control Division uses these exact methods to update their labor norms whenever required by circumstances. The only difference is that there is provision for NALC to direct certain manhours through the Fleet Readiness Support Meetings. Therefore this becomes a factor which can be negotiated at the FRSM. The methods used by Workload Planning and Control at the depot are in consonance with accepted accounting practices.

The method by which the Budget Branch translates these hours into a dollar value utilizes a historical base which is then "updated" to reflect known and/or predicted changes for the interim period until the period of execution of

the rate. This method agrees with accepted accounting practices. The entire process of Labor Rate Development at NARF Norfolk is in agreement with accepted accounting practices.

C. DIRECT MATERIAL RATE DEVELOPMENT

1. Accepted Accounting Practice

The information in this section was developed from the texts of Matz and Usry [Ref. 8], Louderback and Dominiack [Ref. 9], Spiller and Gosman [Ref. 10] and DODINST 7220.29-H [Ref. 1]. It is seldom possible to forecast accurately the amount and type of materials needed for a facility even for a short future period. There are several forecasting techniques available but these are merely indicative of the difficulty of the task. Three techniques widely used in manufacturing are factor listing or barometric methods, statistical methods and forecasting surveys.

Factor listing involves identifying and listing all of the conditions, both favorable and unfavorable, likely to influence the usage of materials in a process. It relies upon the forecaster's judgment to evaluate the degree of the influence factor. Barometric methods result in a more systematic factor listing.

Statistical methods involve historical patterns arranged in chronological order. There are various methods that vary in complexity, but the object is to recognize past patterns and project them into the future. Cylical or seasonal patterns and trends can be easily recognized by using

graphical analysis. A moving average can be used to smooth the graph and remove or lessen irregular fluctuations but the object is to mathematically describe the trends over a period of time.

Forecasting surveys are used to avoid the sole use of historical data to determine future prospects. They are commonly used to determine customer intentions with regard to future consumption of goods or services.

Once a quantity for future usage has been determined, the pricing of that quantity is a fairly simple task. The supplier must be determined or historical prices of like items can be ascertained. Ideally the supplier would be contracted to provide the materials for a fixed price throughout the life of the period in question, but in reality this would be difficult to achieve. Realistically the best that a forecaster could hope for is a fairly accurate guess at inflation factors and known or expected price increases/decreases. These rates could then be applied to the forecasted amounts from above and a total price could be determined.

2. Material Rate Development at NARF Norfolk

a. Introduction

Material rate development at NARF Norfolk is also the responsibility of the Budget Branch of the Comptroller Division [Refs. 11,12]. The Budget Analyst who develops the labor rates is also responsible for the development of the material rates. The method used is similar to the statistical

method described above and is explained in this section. The rate is developed as a Unit Material Cost and is based on purely historical statistics.

b. Historical Data

The historical data are obtained from several internal reports including the NIF 605 report and the NIF 603 report. The data contained in these reports are obtained from the cost accumulation system which is explained in Chapter IV. The NIF 605 report is a monthly report and provides the analyst with final charges, including direct materials, accumulated by Job Order Number on closed jobs. The NIF 603 report is a monthly report on the Job Order level that provides the same information on open jobs. The analyst attempts to use as broad a spread as possible for historical data on materials. An entire fiscal year is the normal spread instead of one quarter as was used for labor rate development. Exhibit 3-2 is an example of historical data workup by the budget analyst. The "2V5" in the first column merely is a code for the customer (e.g., AIRLANT active, AIRLANT reserve). The averages at the bottom of the figure are a result of averaging the total completions and the total Work In Progress at the end of fiscal year 1984.

The analyst works up the historical data in a form similar to Exhibit 3-2 and submits these data to the Material Review Committee for review and final agreement on the materials historical base. The Material Review Committee for

FY84 J57P10 REPAIR MATERIAL COSTS

FY84 Inductions by customer		Quantity Inducted	Quantity in Process	Material Cost	Average Unit Material
1st Quarter	2V5	8	0	$ 166,501	$ 20,813
	2E5	2	0	9,491	4,746
2nd Quarter	2G5	8	0	567,173	70,897
	2F5	3	0	347,213	115,738
3rd Quarter	2C5	6	0	179,437	29,906
	235	1	0	8,894	8,894
	2R5	2	0	135,074	67,537
4th Quarter	275	10	1	655,142	65,514
	2M5	2	1	368,721	184,361
Total		42	2	2,437,646	59,026
Total Completions		40		2,052,479	52,400
Total In Process			2	385,167	192,583

Average Material:

Completions	-	$ 52,400
In Process	-	192,583
All	-	59,026

Exhibit 3-2

Source: Reference 11

any task within the Engine Program consists of the following members: Budget Branch Supervisor, Program Manager, Engines Project Officer, Engine Workload Planning Section Supervisor, and the Engine Technical Support Branch Supervisor. The Budget Analyst responsible for the rate formulation is also in attendance. The Material Review Committee for tasks involving other programs would consist of the same core of personnel and the appropriate personnel from that program. The Material Review Committee plays a vital role in the selection of the historical base and in fact selects the base through the agreement of the personnel on the committee. For the FY86 J57P10 Engine Repair Material Base, the Material Review Committee decided to use Item (2) of Exhibit 3-3, the average for all work of FY84, $59,026.00. The rejection of Item (1), the average of all completions, was based on the fact that the high material costs of the final two incompletions were partially due to changes in the repair cycle of the engine which was expected to continue for the foreseeable future. [Refs. 11, 12]

c. Manipulation of Historical Base

Once the historical base has been approved by the Material Review Committee (Item (3), Exhibit 3-3), the analyst can complete the final adjustments to arrive at a predicted Unit Materials Cost as illustrated in Exhibit 3-3. This is accomplished by applying factors for either known or forecasted changes from the historical base time period until

FY84 J57P10 REPAIR MATERIAL RATE DEVELOPMENT

FY84 History: 40 completed, 2 in rocess

(1)	Average Unit Material for Completions:		$ 52,400.00
(2)	Average for All Inductions:		59,026.00

The Material Review Committee decided on $ 59,026.00 as the historical base.

(3)	Base:		$ 59,026.00
(4)	FY85 Price Increase:	X	1.03366*
(5)	FY85 Breakeven:		61,013.00
(6)	FY86 Price Cut:	X	0.9244**
(7)	FY86 Base Material		56,400.00
(8)	ADVLR Material Estimate	+	6,159.00
(9)	FY86 Unit Material Price (before round)		62,559.00
(10)	FY86 Unit Material Price (rounded)		$ 62,600.00

* Guidance from NALC

**Based on supply source mix, a 7.56% decrease vs. the standard 8.85% was used on the advice of the Material Review Committee.

Exhibit 3-3

Source: Reference 11

the period for which the materials rate estimate is being made (Items (4)-(7), Exhibit 3-3). NALC normally supplies standard price increases for each supply source to the NARF Material Support Division. The Material Review Committee may also recommend any changes to standard fiscal year price increases/cuts that have been recommended by NALC.

The Material Support Division does a supply source analysis to determine the percentage of materials that the various supply sources will supply for the task and then uses a weighted average to determine the fiscal year price increase/decrease to be used by the analyst in rate determination. Starting in fiscal year 1986, Aviation Depot Level Repairables (AVDLR) estimates will be added as a cost for Unit Material Costs (Item (8), Exhibit 3-3). Prior to FY 1986 this was termed Government Furnished Materials (GFM) and not added to the cost of the final product. The final Unit Material Cost is submitted to NALC for approval (Item (10), Exhibit 3-3).

3. Comparison of NARF Direct Material Rate Development to Accepted Accounting Practices

Within accepted accounting practices there are several methods for determining a Direct Material Rate for use in rate development [Refs. 8,9,10]. One of these methods is described in part 1 of this section as a statistical method which uses historical patterns. The method involves identifying patterns and projecting them into the future. The pricing of the quantity is a fairly simple task.

NARF Norfolk uses a historical base to forecast future materials usages for each function. The historical data are carefully worked up to allow a Material Review Committee to be able to estimate the future material requirements for that function. The committee then decides what the future estimate of the materials required are in today's dollars. This estimate is then manipulated by inflation factors and source mix estimates to arrive at the final Direct Material Rate for the execution period. There appear to be no discrepancies in this method when comparing it to accepted accounting practices. The "committee factor" allows for the corporate knowledge of all the individuals involved to be utilized in determining the rate and does not appear dysfunctional when used in this context.

D. OVERHEAD RATE DEVELOPMENT

1. Accepted Accounting Practice

Factory overhead is defined as indirect materials, indirect labor, and all other factory expenses that cannot be easily identified with nor charged as a direct rate to specific jobs or final cost objectives. Overhead consists of two parts, fixed and variable. Fixed overhead remains relatively constant with regard to production volume. Variable overhead changes in direct proportion to production volume.

Various overhead expenses must be allocated on an acceptable basis to all production over any time period. Allocation is normally done over a base such as actual direct

labor dollars, direct labor hours, machine hours, or some other base with a relationship to the type of work done. Since it is impossible, by definition, to track all overhead costs to a specific cost objective, it must be done by some arbitrary but reasonable allocation method. A predetermined overhead rate provides such a logical and equitable allocation.

If a rate determination system is to provide reasonably accurate cost information, base selection for overhead allocation is of utmost importance. The primary object of selecting a base is to provide accurate distribution of indirect costs in a reasonable proportion to the causal relationship to jobs, products or work performed. The base must also be easily translated into a total factory overhead cost to arrive at a total estimated production cost. Simplicity and low administrative cost should be a secondary objective of base selection.

The direct labor cost base is the most widely used method of applying overhead to final cost objectives. This base is relatively easy to use but there are two main problems with it:

(1) Factory overhead is looked on as adding to the value of a product or job. Depreciation of machinery is usually a major portion of the value added and it may bear little relationship to the direct labor payroll.

(2) Total direct labor cost differentiates between high and low labor wages. A job that is done by a technician with a high labor wage will be charged more overhead on this basis than one which is done by a low wage worker. There may therefore be different overhead rates for the same job which happens to be done by a worker whose wage is higher merely because of seniority.

The direct labor hour base is designed to overcome the second problem associated with using the direct labor cost base. In this case the overhead rate is based on direct labor hours and is computed by dividing estimated factory overhead by estimated direct labor hours to arrive at a rate per direct labor hour.

The use of this base requires accurate tracking of direct labor hours by job or product. Timekeeping records must be designed to accommodate the additional data. As long as labor hours are the chief factor in production processes, this is acceptable as the most equitable base for allocating overhead.

When calculating an overhead rate, the activity level (i.e., estimated direct labor hours) is extremely important. The greater the estimated number of direct labor hours, the lower the portion of fixed overhead allocated to a direct labor hour. The activity level can be selected on the basis of normal capacity or expected actual capacity.

The long-range planning approach is the normal capacity method. It calculates an overhead rate which is based on expenses and production at an average utilization of the physical plant over a long time period to level out the unusual fluctuations that occur in every factor. As a result applied overhead will usually vary from the actual overhead incurred. This is not necessarily a negative situation. When these variances are studied, they usually will reveal useful information for management control purposes.

Short-range planning approaches use the expected actual capacity method. This method calculates the overhead rate to be the rate that will be applied based on actual expected output for the production period. At times the rate applied approaches the actual overhead incurred which makes this system seem logical and acceptable.

2. Overhead Rate Development at NARF Norfolk

a. Introduction

Overhead rate development also comes under the purview of the Budget Branch of the Comptroller Division. There is one Budget Analyst in the Budget Branch who is primarily responsible for the actual calculations and flow of paperwork for overhead preparation, but the actual rate is developed over a period of time and "by committee." The rate to be applied is broken into two primary functions, the General and Administrative Overhead rate and the Production Overhead rate. The following analysis is the result of discussions with NARF Norfolk's Budget Branch supervisor. [Ref. 13] Exhibit 3-4 is a flow chart depicting Overhead Rate development at NARF Norfolk.

b. General and Administrative Overhead

The General and Administrative (G&A) overhead rate can be thought of as the facility's fixed overhead rate. The rate is applied over a direct labor hour base and remains constant for each Cost Center throughout the entire NARF. This rate includes charges for such services as the Comptroller

FLOW CHART DEPICTING RATE DEVELOPMENT
AT NARF NORFOLK

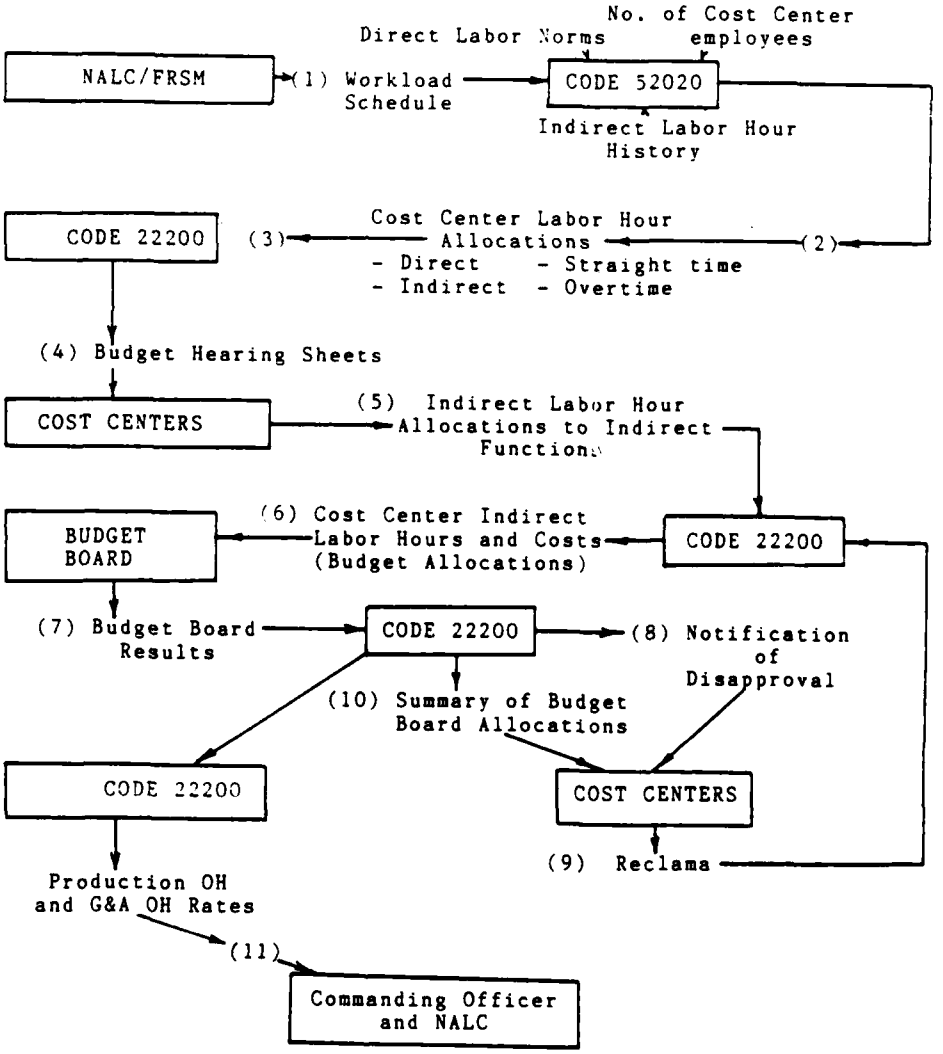

Exhibit 3-4

Source: Reference 12

Division, the Management Services Division, the Civilian Personnel Office, Plant Services. G&A is determined through a method employing historical costs tempered with known and expected changes. They are then sent to the Budget Board for approval and forwarded to the Executive Officer and Commanding Officer for final approval. The analysis of Production Overhead which follows shows the approval process which the Production Overhead Rate goes through in more detail and the process for the General and Administrative Overhead Rate is similar.

c. Production Overhead

Similar to the previously discussed rate development programs, the overhead rate development begins with the Fleet Readiness Support Meetings (FRSM's) at NALC. These meetings include representatives from all of the NARF's and are used to negotiate workload, scheduling and rates. After the workload is negotiated at the FRSM, NALC assigns the NARF a workload schedule (Item (1) Exhibit 3-4). This workload schedule applies to the A-11 Budget (President's Appropriation Budget), Funding Budgets (budgets presented externally for funding requests), and Quarterly Operating Budgets (internal operating budgets used for management control purposes).

The Workload Control Officer (Code 52020) receives this schedule and combines it with various inputs from the cost accumulation system and management control reports including indirect labor hour history, present and projected number of cost center full time employees and direct labor

hour norms worked up by his department to arrive at a set of Cost Center labor hour allocations (Item (2), Exhibit 3-4). These allocations are in the form of direct straight time manhours using the norms discussed in the previous sections. Overtime manhours are allocated based on history and the constraints of NALC and the NARF Commanding Officer. Indirect straight time manhours are allocated based on the number of full time employees working in the Cost Center as directed by the Executive Officer. These final allocations are passed to the Budget Office (Code 22200) (Item (3), Exhibit 3-4).

In turn, the Budget Office passes these allocations to the individual cost centers in the form of Budget Board Hearing Sheets (Item (4), Exhibit 3-4). Budget Board Hearing Sheets are computer printouts and forms to aid the individual cost center budget coordinators in developing the indirect budget. The Budget Board Hearing Sheets give a recent history of all indirect allocations for the cost center and provides the budget coordinators with both labor hour and cost information which will maintain the "status quo" within the limits of known changes. The Cost Center budget coordinators spread the indirect labor hours (straight time and overtime) to the various indirect functions (e.g., administration, calibration, supervision, training, cleanup). The coordinators also develop budgets for indirect materials in much the same way as direct materials are budgeted. The Cost Centers submit these indirect

labor hour, material and other allocations back to Code 22200 (Item (5), Exhibit 3-4).

A preliminary review is conducted by the Budget Branch to ensure completeness and highlight significant deviations from the Code 52020 allocations. Cost Centers are requested to give written justification for these deviations. The Budget Branch then consolidates all of the submissions, summarizes them and submits them to the Budget Board for approval (Item (6), Exhibit 3-4). The Budget Board, chaired by the Executive Officer, consists of the Production Officer, Management Services Officer, Management Controls Department Head (Comptroller), Deputy Comptroller, program managers, the Budget Branch Supervisor, and the cost center department heads. The board examines the cost center indirect budget submissions to see if they are sufficiently justified and meet the overall command goals as defined by the Commanding Officer and Executive Officer. The submissions are then either approved or disapproved (Item (7), Exhibit 3-4). In cases of disapproval (Item (8), Exhibit 3-4), the Budget Branch Supervisor or the Executive Officer formally notifies the cost center and that cost center has the right to request a review of the decision (Item (9), Exhibit 3-4). The appeal is submitted to the board through the same process as the original submission. The final decisions of the Budget Board are distributed to the cost centers (Item (10), Exhibit 3-4) via a memorandum signed by the Executive Officer.

Preparation of the indirect rates for the production overhead rate for each cost center can now be started by the Budget Branch. The rate is applied by dividing the total indirect costs negotiated at the Budget Board by the allocation base. The allocation base for production overhead is either projected actual direct labor hours or unit output, depending upon the program/subprogram for which the rate is being developed. As stated above, the General and Administrative Overhead Rate is allocated over direct labor hours. This rate is submitted for approval to the NARF Commanding Officer and NALC (Item (11), Exhibit 3-4). Appendix A is an example of actual applied overhead rates for Fiscal Year 1984 (as of 1 April 1984).

3. Comparison of NARF Overhead Rate Development to Accepted Accounting Practices

Accounting practices authorities realize that it is very difficult to estimate overhead (production and G&A) accurately [Ref. 8]. Acceptable methods vary and the major emphasis of this estimation is placed on selecting the base over which the estimated total is spread. Matz and Usry, Louderback and Dominiak and Spiller and Gosman agree that the most acceptable bases are those that include direct labor, if the production is labor intensive. [Refs. 8,9,10]

NARF Norfolk uses a direct labor hour base and this is an acceptable base for an overhead activity level. The estimate of total overhead for the execution period in question is more difficult. NARF uses a committee method which allows advocates

for programs to request and justify overhead items. These are balanced against each other and budget constraints in order to arrive at a final overall estimate for overhead. The committee (Budget Board) is constrained by both the Commanding Officer and NALC, but can request a budget increase if sufficiently justifiable. This method appears to be in consonance with accepted accounting practices. [Refs. 12,14]

E. SUMMARY

The three segments of the rates can be combined to result in a fixed unit price, an hourly rate or any combination to suit the purpose for which the rate was developed. Chapter IV will discuss the various ways that NARF Norfolk uses the rates.

IV. RATE USAGE/COST ACCUMULATION

A. INTRODUCTION

Rates are formulated at NARF Norfolk for several reasons [Ref. 11, 12]. Developing billing rates for customers is a primary reason for rate development and budgeting is another reason to develop rates. The rates are developed in the fashion explained in Chapter III no matter the reason for which they are being developed. [Ref. 11] The following discussion on rate stabilization is included to explain the manipulations that these billing rates may go through at echelons within and above the depot level. The discussion of actual cost accumulation is included to give the reader an understanding for the methods employed by this depot to track actual costs for management control. The actual costs are also included in historical bases to be used for future rate development. Finally, a discussion of the DODINST 7220.29-H Uniform Cost Accounting System is included to compare internal and external reporting requirements.

B. RATE STABILIZATION

1. History/Purpose

In the early 1970's, the various depots within the Department of Defense were following a billing and rate formulation practice that had the purpose of allowing the individual

depot to "break even" at the end of every fiscal year. The depots were allowed to change their rates essentially whenever they deemed it necessary. They used this flexibility to attempt to maintain an Accumulated Operating Results (AOR) Account balance of zero at the end of the fiscal year. As a result most depots were changing their billing rates at least quarterly. This resulted in the individual customers having problems budgeting for their depot-level maintenance programs.

For instance, if the rates were to be revised upward during the fiscal year to a point where the customer's appropriated Operations and Maintenance, Navy (O&M,N) budget were to be exceeded, the customer would have no choice but to reduce the input of projects to the depot in order to not risk an R.S. 3679 violation. This "cut" in the programs for the depot would result in the following problems with the rates. Since the rates were formulated for a certain level of production and one of the inputs to the formulation is fixed overhead, the rates would have to be revised upward in order to recoup the lost revenues associated with this loss of fixed overhead. Since all costs would eventually be passed on to the customer anyway, it is evident that there must be a more efficient method for the Navy to achieve its goals and objectives in depot-level maintenance programs.

A principle objective of the rate stabilization program is to shield the customer from rate fluctuations due to wide variances in cost escalation (inflation) and simplify the

preparation of the customers' budget estimations for their appropriations. This would allow the DOD and Navy to fully accomplish their "programs" without the problems described above. The rate stabilization program was established to be a multi-year budgetary concept using the idea that the break-even point in Industrial Fund activities should occur at the end of a three year period. The industrial fund is used as a "shock absorber" to contain the financial fluctuations of the fiscal year until they can be restored by rate changes over the following two fiscal years.

The program requires the Navy Industrial Fund activity to use these predetermined rates for billing purposes and does not allow most activities to revise them throughout an entire fiscal year. The exceptions to this are the shipyards and some Naval Air Rework Facility programs which are required to maintain the same rates for the entire period of the execution of the reimbursable order (while the ship is in the yard or the aircraft is at the NARF), regardless of the number of fiscal years involved. Rate changes during the period of execution have prohibitively stringent rules and may be made only with the approval of the Assistant Secretary of Defense (Comptroller).

The Deputy Secretary of Defense established the rate stabilization program by revising DOD Directive 7410.4 to include rate stabilization in all DOD Industrial Funds. This program was implemented in September of 1975 and was

supposed to have retroactive application to the entire FY 1976 Depot Maintenance Program. NAVCOMPT NOTE 7111 of 10 June 1975 announced the program to all Navy Industrial Fund activities with the DOD requirements for the establishment of stabilized rates. NAVCOMPT INSTRUCTION 7600.23B provides amplifying guidance, stating the purpose of aligning the rates to recover operating costs. It discusses the responsibility of the Activity Group manager to provide for positive or negative recoupment "to offset the total prior year gains or losses thereby achieving zero profit and loss in the Accumulated Operating Results Account of the Activity Group" and to provide for rate changes resulting from changed conditions in the A-11 Budgets (Industrial Fund appropriations budgets) and changes in customer programs. In Fiscal Year 1982 DOD directed the establishment of unit prices for high volume, repetitive work accomplished in some industrial fund rework facilities, including the NARFs.

2. Rate Stabilization at NARF Norfolk

The stabilized rate program at NARF Norfolk is in place and follows the program guidance as outlined in both the NAVCOMPT Manual, Volume 5, Chapter 2, Part F, and also NAVCOMPT INSTRUCTION 7600.23B. The following section is a description of the process followed for a rate formulation at the depot level, utilizing Fiscal Year 1986 as the execution period for which the rates are being developed. The section is a summary of information accumulated through several interviews of key

budget personnel at NARF Norfolk in July and September of 1985.

3. Rate Development Time Cycle

a. Introduction

Rates are developed and actual costs are tracked at NARF Norfolk for several reasons. Rate development is used for budgeting purposes, including the A-11 Budget, Funding Budgets and Operating Budgets. The A-11 Budget is the process of budgeting for appropriations for the President's Budget. In the late winter or early spring (February/March) of 1984, the depot received from the Naval Air Logistics Center the projected production requirements for NARF Norfolk for FY1986. Over the next two months the NARF formulated the rates/fixed unit prices to be used in each program. These rates may be a fixed unit price, a dollar figure per direct labor man-hour or any other suitable rate or group of rates which most closely follows the recoupment of actual costs. In actuality the NARF is told what factors to employ in this construction of the rates as discussed in Chapter III. These rates/prices were accumulated, reviewed and forwarded to NALC by the early spring (May/June) of 1984 in the form of the A-11 Budget. NALC used these rates as the basis for the initial input from the NARF for their FY86 billing (stabilized) rates.

b. Time Cycle

During the next year, NALC and NAVCOMPT formulated the stabilized rates/fixed unit prices for the entire NIF

activity group. These rates were reviewed and revised during each Fleet Readiness Support Meeting as discussed in the previous chapter. Over the year the NALC continuously receives updated production information and revises the rates to reflect this higher or lower production rate, based on the new depot schedules. NAVCOMPT places a recoupment factor, either positive or negative, across the Navy Industrial Fund Activity Group board, to recoup previous years losses to the NIF corpus or rebate customers for a positive overall AOR from the past years.

NAVCOMPT directs the use of its own wage/salary rates on the labor rates. This rate appears to be based on OMB/OSD projections of the President's Budget's forecasted inflation factors/government employees' wage rates and is not necessarily based on local conditions/labor contracts. For instance FY1986 labor rates reflect a five percent salary reduction for civilian workers directed by NAVCOMPT even though most expect a salary increase. The rates are also adjusted for the Asset Capitalization Program, which allows NIF money to be used for minor construction programs and equipment purchases.

The final revision occurs when the Office of the Assistant Secretary of Defense (Comptroller) and NAVCOMPT adjust the rates with a percent escalation factor. This is the process of "bottom-lining" the NIF budget to match the total appropriated funds available. At some point, the NIF

budget must equal the customers' appropriation budgets submitted to Congress. This is when that happens. The escalation factor is figured so that the customer's entire appropriated funds (money available) matches the NIF budget figured by the compilation of the submitted rates (money required). The rates are adjusted to match that amount which is available. This makes the accounting match, but gives little regard to the individual depots, since the workload is not altered to match the rate change. The amount which can be billed to the customer is altered by an amount necessary to match the appropriated fund of that customer. The depot will have to make up as much of the difference as possible by "belt tightening," with the NIF corpus eventually absorbing the rest.

This final rate was then approved by the participants at the August, 1985 FRSM and forwarded to the Assistant Secretary of Defense (Comptroller) for approval. This rate was then returned as the final billing rate to the NARF and the customers in late August of 1985. The bottom line Net Operating Result that the NARF is expected to achieve in Fiscal Year 1986 was also received at the depot during this time frame. This figure may indicate a positive recoupment of funds for the fiscal year or a negative recoupment to either make up for losses accumulated in prior years over the entire Activity Group or to rebate inadvertent previous years' profits to the various customers.

C. ACTUAL COST ACCUMULATION

1. Accepted Accounting Practice

a. Introduction

There are two methods for allocating costs to units of production, actual cost and standard cost systems. If a facility uses an actual or historical cost system, costs are collected as they occur and they are recorded against the job or lot for which they are actually used. These costs, though recorded at the time of use, are usually not "reported" until completion of the manufacturing process or services rendered. A standard cost system applies cost at a predetermined rate based on standards for both quantities and dollar amounts. Actual costs are also recorded and variances between standard and actual costs are collected and analyzed for management control purposes. These two methods may be used with either a job order costing system or a process cost accumulation system.

b. Job Order Costing System

The job order cost system can be used when the possibility of physically identifying individual jobs exists. A variation of job order costing includes costing orders by lots. Job order costing allows the computation of a profit or loss on each order. This system also provides opportunities for controlling costs, since cost accumulation occurs throughout the life of the job. As costs are accumulated in a job order costing system, they are recorded on a job order cost sheet. These sheets can differ in content and can either

contain manually entered costs or be computerized. Each cost sheet is designed to collect the costs for an individual job order as it is processed through the plant. Each is assigned a job number and labor and materials requisitions are recorded as they occur. Factory overhead is computed as an estimate, rather than actual costs incurred. This is called applied factory overhead.

c. Process Costing System

Process costing is used when physical identification of individual jobs is difficult or impossible. This method is applicable especially in industries such as chemical plants, textiles, breweries. Some industries use a combination of both job order and process costing. NARF Norfolk is required by DOD INST 7220.29-H to use a job order cost system.

2. Cost Accumulation at NARF Norfolk

a. Costing System

The following information was accumulated through a series of interviews at NARF Norfolk in both July and September of 1985. NARF Norfolk uses actual costing in conjunction with a job order costing system as requiredby DOD INST 7220.29-H. When an engine, aircraft or missile is inducted into the facility under the Engine, Aircraft or Missile Programs, it is assigned an individual Job Order Number (JON) which it maintains throughout its repair or rework cycle. There may be more than one JON per physical unit inducted, depending on how many different functions are to be accomplished on the unit. For instance, an

aircraft may get one JON for the Standard Depot Level Maintenance (SDLM) work to be completed and a second JON for a block update or series of Airframe Changes (AFC's) that will be completed during the SDLM cycle. The following discussion centers on the Aircraft Program which is indicative of the cost accumulation used throughout the facility for job order costing.

b. Operating Documents

When an aircraft is inducted into the facility, the Planning Branch issues the Operating Documents for that particular JON. Contained within the Operating Documents is the Master Data Record (MDR). The MDR is used by the NARF to prepare all other documents associated with a JON such as Shop Orders, Job Cards and Work-in-Process records. The MDR is customized by the Induction and Inspection team which allows for individualization of each JON. The MDR is then used to produce both Shop Orders and Job Cards for the work on the aircraft.

The Shop Orders control and schedule the actual work to be done for all aspects of the aircraft. The Job Order Cards are used in the tracking of costs to the individual JON. For every Shop Order there are several Job Order Cards. Each Job Order Card is associated with a single specific action to be taken on the job order. For instance a Job Order Card would be issued for the cleaning and stripping of the nose strut of an inducted F-14 aircraft. The Job Order Card is a

computer card which is coded with the JON, the job to be performed and the shop to perform the job.

c. Actual Cost Tracking

The accumulation of costs at NARF Norfolk is computerized through the use of Source Data Automation Equipment (SDAE). This system uses computer terminals called transactors that are located throughout the facility. These transactors are programmed for several purposes, including "time card punching," and, most importantly, cost accumulation.

Each employee at NARF has an Identification Card which is coded with an identification number assigned to that individual only. When checking in for work, the employee inserts the ID card into the upper slot on the transactor and the system automatically logs the employee into work.

During the workday, when an employee receives a job to be accomplished, the employee places the Job Order Card into the bottom slot and the ID card into the top slot. The computer then logs the worker onto that job and tracks actual time on that job until the employee logs onto another Job Order Card. The computer "assumes" that the employee continues working on the original job until the employee logs on with another Job Order Card unless the employee manually logs off that job for some reason. The equipment has also been programmed with the employee's schedule including lunch, scheduled coffee breaks and work hours. Actual employee wages are also programmed and the computer calculates actual labor

costs to be charged to the Job Order Card and as a result, that particular Job Order.

Direct material costs are tracked similarly through the Source Data Automation Equipment. When material is requisitioned for a job, it is entered into the SDAE and accumulated throughout the life of the job. Material is charged at catalog price, if known, or actual cost at time of purchase. Minor materials are charged to the job order on a standard based on norms developed by the Materials Department.

Overhead is applied on a predetermined rate over a base of actual labor hours. All of these costs are tracked and combined in a Work-in-Process account by job order and are available to the managers on a "real time" basis in raw data form. Also a manager looking for a particular component can call up the information on the SDAE from any transactor and find which shop has that piece in work.

The total cost of a job order can easily be calculated by combining all of the Job Order Cards for that job order into one final cost. A job order is held open for forty-five days after the actual work has been finished on that job in order to assure that all costs may be included. The data are transferred to the local NARDAC for calculation, manipulation and combination into the various Management Control Reports that the facility uses. These reports are referred to as NIF series reports and several of them have been mentioned in previous chapters. They are used for management control, rate

development and accounting purposes. The system is well thought out and, according to the managers using it, works well. As with any system that relies on human input, the problems lie in the fact that it is only as good as the input. If an employee wants to "trick" the system, it is easy to either log off one job early or onto another one late. At present there is no system nor plan to develop á system to check this fault. The managers said they do not believe that this is a significant problem at the depot.

3. Comparison of NARF Actual Cost Accumulation Procedures to Accepted Accounting Practice

Accepted accounting procedures for actual cost accumulation include the job order cost system. The job order cost system identifies all costs associated with a certain "job" and charges those costs to that job. DOD INST 7220.29-H requires that all depots use a job order cost system and this is the basis for NARF Norfolk's system. As explained in the previous section NARF Norfolk uses a very sophisticated computerized system for the tracking of actual costs to individual job orders. The methods used for defining individual job orders are in consonance with the Uniform Cost Accounting System and accepted accounting procedures. [Refs. 8,12,15,16,17]

During the course of research for this thesis, two other depots (the Anniston Army Depot and the San Antonio Air Force Logistics Center) were visited. The system used for cost accumulation at NARF Norfolk was the newest and appeared to have the capability to be the most accurate of any

in place among these three depots. The NARF system has the capability to track actual labor costs associated with individual job orders and actual direct material costs. All others that were researched used a method which tracked labor hours but then used an average of some type, based on either skill level or work center averages, to figure the costs. Accounting literature accepts either the tracking of actual costs or using averages for actual cost accumulation. This system is new and, according to several interviewees, appears to be working very well. It does have the potential to have problems as mentioned in the last section. [Refs. 12,14,15,16,17]

D. THE UNIFORM COST ACCOUNTING SYSTEM (7220.29-H)

1. History/Objectives

The Department of Defense began attempting to implement a uniform cost accounting system for the DOD depots as early as 1963. Secretary of Defense McNamara was attempting to gather control of runaway costs and centralize the entire Department of Defense. Since 1975 the Office of the Assistant Secretary of Defense for Management Systems, has had in process DOD INST 7220.29-H, the Department of Defense Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook.

The objectives, as stated by the instruction are

> "to establish a uniform cost accounting system for use in accumulating the costs of depot maintenance activities as they relate to the weapon systems supported or items maintained" and to "assist in the measurement of productivity, the development of performance and cost standards and determination of areas for management

emphasis. In addition, it will provide a means of identifying maintenance capability, duplication of capacity and indicate both actual and potential areas for interservice support of maintenance workload." The handbook is to provide principles which will "assure uniform recordation, accumulation and reporting on depot maintenance operations and maintenance support activities." [Ref. 1]

The entire program was set up to centralize responsibility in the DOD depot maintenance system and give at least an appearance of control.

2. Description of the System

The cost accounting standards used by the system are derived from actual cost accounting practices used by government and contractor maintenance activities, textbooks on the subject, and promulgations by the Cost Accounting Standards Board (CASB) [Ref. 1]. The instruction specifies that estimations of costs used in formulating stable rates for billing shall be consistent with rates used in accumulating and reporting costs. These rates used in accumulating and reporting costs shall be consistent with the rates used in estimating costs for the negotiation of a specific price. The consistencies in rate development do not mean that the rates have to be identical, only that they are formulated in an identical fashion. This is in agreement with the CASB. [Refs. 1,2] Rate setting and pricing are specifically not included in 7220.29-H, with the exception that the use of billing rates to determine actual costs is prohibited unless they happen to coincidentally be identical.

All costs that are incurred for the same purpose are classified as either direct costs only or indirect costs only with respect to job orders (in accordance with CAS part 402). Depots may only use standard costs for direct material and direct labor if standard costs are entered into the books of account, they and related variances are accounted for at the job order level and the revision and setting of standards and disposition of variances are approved by the Office of the Assistant Secretary of Defense for Management Systems and are consistently followed. [Ref. 1]

The handbook requires that the depots use a Job Order Cost Accounting System. Units subject to "preshop analysis" or "examination and evaluation" and with an estimated cost of maintenance in excess of $90,000 must have a separate job order number for each unit. Units not subject to "preshop analysis" or "examination and evaluation" are required to have a job order number for either the month's or quarter's inductions, depending upon the unit maintenance cost. In accordance with 7220.29-H this practice is followed carefully at NARF Norfolk.

The system provides for the use of developed standards for labor, material and indirect costs for each job order. Analysis of variances are made to determine areas where more management attention is needed. To develop the standards, the depots must use industrial engineering techniques where high value, high volume work is done. These standards must be

reevaluated at least once every two years. Interviews with personnel at NARF indicate that the standards are updated much more often at the depot. Workload Planning and Control is in charge of these updates which utilize historical data for bases to manipulate. [Refs. 11,12,13]

3. Reporting Requirements with 7220.29-H

The reporting requirements associated with the Uniform Cost Accounting System were developed by the Directorate for Maintenance Policy, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics). The physical reporting medium is a magnetic tape that is to be updated quarterly by the depot on a cumulative basis for provisionally closed completed job orders. The tape is to be maintained by each DOD component with the final fiscal year tape to be submitted to the OASD (A&L) within 90 days of the end of the fiscal year. A complete description of each of the 50 fields on the tape can be found in Chapter 7 of DOD INST 7220.29-H. All costs reported under the Uniform Cost Accounting system are costs accumulated from finished and closed out jobs. There are no provisions for reporting work in process.

NARF Norfolk attempts to provide the 7220.29-H data base with timely and correct information. NARDAC provides NARF with a Management Control Report (NIF 605) which is titled "Financially Closed Job Orders." This report breaks out Civilian Direct Labor Hours, Military Direct Labor Hours, Government Furnished Materials, NIF Materials, G&A Overhead,

Production Overhead and Totals. NARDAC also supplies a Uniform Cost Accounting Report to NARF that is accumulated from the data base of financially closed job orders. The Budget Branch compares the two reports and updates the UCA report manually if necessary. Since each job order on the UCA report contains 50 fields of information, this check and correct procedure is a full-time job at the NARF. The UCA reporting system was characterized by NARF staff as a very low priority within the Comptroller Department. This reporting system is totally external to the depot and as such only represents another report that must be filled out in order to satisfy external requirements. It is therefore accomplished in a fashion to create as little headache as possible. As long as they do not receive negative input from the chain of command, they are satisfied with whatever reports and numbers are submitted. The sources admit that the numbers accumulated by the UCA system are not representative of their actual production at the NARF, although they cannot explain the variances. The reasoning behind this attitude of casualness is that the UCA system numbers have no impact on the depot and the deep analysis of such variances would be a waste of effort.

This nonchalant attitude is fostered by the fact that the reporting requirements of 7220.29-H are not in line with the Management Control System used by the NARF. The actual numbers that are reported for 7220.29-H are not of any use to the depot and therefore are not carefully considered. The

objective of the UCA system to compare and contrast the various depots within the Department of Defense is "like comparing apples and oranges," according to an interviewee at NARF Norfolk. The NAVAIR Industrial Financial Management System will bring more uniformity to the various NARFs' accounting systems when it is fully implemented. Until then control and accounting systems still vary widely among the NARFs according to local conditions. He also mentioned that the systems used by the different services are even further disparate and therefore do not lend themselves to comparison at all. Interviews with staff at both an Army depot and an Air Force depot echoed this claim. This realization at the depot level is part of the reason behind the low priority given to the 7220.29-H reporting system.

E. SUMMARY

This chapter has explained the various accounting systems within NARF Norfolk. The rate stabilization and billing system is different from the budgeting system, which in turn is different from, but incorporates the actual cost accumulation system. The methods for developing rates for the billing and budgeting system are the same as illustrated in Chapter III, but comparison of the same rates (for instance the TF30P414A Repair Rates for fiscal year 1984) between the two systems will normally reveal different numbers. The reasons for these differences are the subjects for Chapter V.

V. DIFFERENCES IN RATES--THE CAUSES

A. INTRODUCTION

Chapter III discussed the methods that are employed at NARF Norfolk to develop rates for the various uses explained in Chapter IV. As mentioned in Chapter IV, DOD INST 7220.29-H requires that the method of rate development be consistent for billing purposes, budgeting and cost accumulation. The depot consistently constructs a rate in the same manner, no matter what the eventual purpose of the rate. However the numbers do change over the life cycle of the rate. Exhibit 5-1 is an example of a single rate for a subprogram developed over a period of four and a half years. Exhibit 5-2 is a continuation of that rate applied to a single function over the same four and a half years. The following chapter discusses these rate changes and the reasons behind the changes. These exhibits were obtained during interviews with Budget Analysts in the Budget Branch of NARF Norfolk in September of 1985.

B. DIFFERENCES IN THE ENGINES REPAIR RATES

1. Direct Labor Rate

a. Within a Single Fiscal Year

A comparison of labor rates in Exhibit 5-1 for Fiscal Year 1982 is a good example of changing labor rates with time passage. Items (1)-(8) show a labor rate which changes four different times over a period of two and a half years.

ENGINES REPAIR RATES

FISCAL YEAR 1982

	DATE	LABOR	PRODUCTION OH	G&A OH	RECOUP	TOTAL COST PER LABOR HOUR
(1)	Apr 1980*	12.33	11.56	15.36	-	39.25
(2)	Aug 1980	12.15	11.56	15.36	-	39.07
(3)	Oct 1980	12.15	11.56	15.36	-	39.07
(4)	Jan 1981	12.62	14.66	15.40	-	42.68
(5)	Apr 1981	12.17	12.55	14.24	-	38.96
(6)	Jul 1981	12.15	11.56	15.36	-	39.07
(7)	Jul 1982	12.15	11.56	15.36	(1.30)	37.77
(8)	Oct 1982**	12.15	11.56	15.36	(1.30)	37.77

FISCAL YEAR 1983

	DATE	LABOR	PRODUCTION OH	G&A OH	RECOUP	TOTAL COST PER LABOR HOUR
(9)	Apr 1981*	13.08	12.78	15.00	-	40.86
(10)	Oct 1981	12.92	15.02	16.04	3.86	47.84
(11)	Jan 1982	12.46	12.25	17.04	-	41.75
(12)	Apr 1982	12.46	12.25	17.04	-	41.75
(13)	Jul 1982	12.46	12.25	17.04	-	41.75
(14)	Oct 1982	12.46	12.25	17.04	-	41.75
(15)	Jan 1982**	12.46	12.25	17.04	-	41.75

FISCAL YEAR 1984

	DATE	LABOR	PRODUCTION OH	G&A OH	RECOUP	TOTAL COST PER LABOR HOUR
(16)	Apr 1982*	13.10	11.64	14.96	-	39.70
(17)	Feb 1983	13.00	14.51	17.67	-	45.18
(18)	Feb 1983 (Revision)	13.00	14.52	18.49	-	46.01
(19)	Aug 1983	13.00	14.52	18.49	(8.10)	37.91
(20)	Nov 1984**	13.00	14.52	18.49	(8.10)	37.91

* A-11 Budget
** Final Rate

Exhibit 5-1

Source: Reference 11

TF30P414A REPAIR RATES

FISCAL YEAR 1982

	DATE	NORM	X	TOTAL COST PER DIRECT LABOR HOUR	=	OH+LABOR	UNIT MATERIALS	UNIT COST
(1)	Apr 1980*	1015		39.25		39,839	69,936	109,775
(2)	Aug 1980	930		39.07		36,335	70,800	107,135
(3)	Oct 1980	925		39.07		36,140	70,800	106,940
(4)	Jan 1981	1020		42.68		45,534	74,903	118,437
(5)	Apr 1981	1070		38.96		41,687	70,177	111,864
(6)	Jul 1981**	1060		39.07		41,414	70,800	112,214
(7)	Jul 1982	1060		37.77		40,036	70,800	110,836
(8)	Oct 1982***	1060		37.77		40,036	70,800	110,836

FISCAL YEAR 1983

	DATE	NORM	X	TOTAL COST PER DIRECT LABOR HOUR	=	OH+LABOR	UNIT MATERIALS	UNIT COST
(9)	Apr 1981*	1070		40.86		43,720	75,300	119,020
(10)	Oct 1981	1060		47.84		50,710	75,756	126,466
(11)	Jan 1982	1060		41.75		44,255	69,667	113,922
(12)	Apr 1982	1070		41.75		44,673	69,667	114,340
(13)	Jul 1982**	1060		41.75		44,255	69,667	113,922
(14)	Oct 1982	1060		41.75		44,255	69,667	113,922
(15)	Jan 1982***	1060		41.75		44,255	69,667	113,922

FISCAL YEAR 1984

	DATE	NORM	X	TOTAL COST PER DIRECT LABOR HOUR	=	OH+LABOR	UNIT MATERIALS	UNIT COST
(16)	Apr 1982*	1070		39.70		42,479	73,094	115,573
(17)	Feb 1983	1070		45.18		48,343	131,629	179,972
(18)	Feb 1983 (Revision)	1070		46.01		49,231	131,629	180,860
(19)	Aug 1983**	1070		37.91		40,564	131,629	172,193
(20)	Nov 1984***	1070		37.91		40,564	131,629	172,193

* A-11 Budget
** Stabilized Rate
*** Final Rate

Exhibit 5-2

Source: Reference 11

The rate developed in April of 1980 (Item (1) Labor) of $12.33 was developed for the A-11 (President's) Budget for 1982. As time passed, the rate changed due to changes in inputs to the rate. For instance, the change from $12.33 to $12.15 in August of 1980 (Item (2) Labor) could have been caused by a change in any of the parameters discussed in Chapter III, Part B. A change in the historical base quarter, due to updated information, could cause this $0.18 change, or (and most likely in this case) a change in the wage growth factor or annual pay raise factor could account for the difference. Any of the factors which go into a direct labor rate development could change from one month or week to the next and the latest information available is used to make up the rate.

b. Between Fiscal Years

The labor rates in Items (12) and (16) of Exhibit 5-1 were developed for the same program in the same month and yet still differ by $0.64. The difference can be traced to the fact that different pay raise percentages are factored into each rate. The FY1983 rate of $12.46 (Item (12)) did not include the pay raise percentage for the next year which was included in the FY1984 rate of $13.10 (Item (16)). There was also a small difference in the acceleration rates used for FY1983 and FY1984. Note that rates are being developed all of the way through the target fiscal year and even after the year is finished in some cases. This is necessary in order to update the Quarterly Operating Budget and other budgetary items.

2. Production and General and Administrative Overhead Rates

The Budget Analyst always uses the most current information available when assigned a rate to develop. New overhead rates are developed through the process described in Chapter III, Part C, essentially after every FRSM, when new production quotas are discussed for each future fiscal year in question. The differences in the rows of the Production Overhead and G&A Overhead columns of Exhibit 5-1 are the result of the changes incorporated after these Fleet Readiness Support Meetings conducted at NALC.

3. Recoupment

Positive or negative recoupment factors, such as the negative $1.30 factored into Item (7) of Exhibit 5-1, are at the direction of NALC and NAVCOMPT and are employed in the rate development when directed. The NARF has no input to this factor since it is figured with the entire Navy Industrial Fund Activity Group in mind, as discussed in Chapter IV, Part B.

4. Total Cost per Labor Hour

The last column in Exhibit 5-1 is merely the sum of the first four columns in each row. This rate is applied across all functions within the subprogram "Engines Repair." It is the number found in column two of Exhibit 5-2 which is discussed in the next section.

C. DIFFERENCES IN THE TF30P414A (F-14A ENGINE) REPAIR RATES

1. Norms

As stated in Chapter III, Part B, labor norms at NARF Norfolk are the responsibility of Workload Planning and Control (Code 52020). They are required to be updated at least every two years (DOD INST 7220.29-H), but are normally updated much more often. Workload Planning and Control will update its norms for a function at request from Budgeting or if a FRSM changes the work required for a specific function or the workload of the entire program. A norm can change many times over the course of a rate life cycle. It changed six times over the life of the FY1982 TF30P414A Repair Rate cycle (Items (1)-(8), Exhibit 5-2). It may not change at all during the cycle for a different fiscal year (Items (16)-(20), Exhibit 5-2). The norms usually change because of a difference in the historical base used for analysis, or because the work to be accomplished within that particular function changes.

2. Total Cost per Direct Labor Hour

The causes of the changes in this column have been explained in detail in Part B of this chapter. The column labeled "OH + LABOR" in Exhibit 5-2 is the product of the Norm and the Total Cost per Direct Labor Hour.

3. Unit Materials

Unit Material prices change over time for much the same reasons as Direct Labor Rates. The historical base year for the development may have changed from one rate development to

the next. A large jump in the rate (Item (16) to Item (17), Exhibit 5-2) would imply that the historical quarter had changed or that a major change had taken place in the work to be accomplished in this function which required more materials. Normal changes such as those between Item (1) and Item(2) or (4), Exhibit 5-2, could be caused by a difference in catalog prices, source mix or actual source of supply. The Materials Review Committee could also recommend changes based on any known changes in price increases, cuts, inflation factors, etc.

D. DIFFERENCES BETWEEN DEVELOPED RATES, ACTUAL COST ACCUMULATION AND DODINST 7220.29-H REPORTS

1. Actual Cost Accumulation vs. Developed Rates

Actual cost accumulation, as related in Chapter IV, Part C, is the result of a totally different accounting process from rate development and the differences between a rate which is being used for budgeting purpose (prediction) and the actual costs accumulated for that project are the subject of the variance analyses done for management control purposes throughout the manufacturing world. Actual cost accumulation does not rely on predictions of wage rates, wage growth factors and materials mix forecasts. It is the result of known wage rates, materials usage and prices, etc. A unit cost which is the same for the predicted rate and the actual cost accumulated over the life of the job would be purely coincidental and highly unlikely, given the complexity of the tasks performed at the depot level.

2. Actual Cost Accumulation vs. 7220.29-H Reports

Since the costs posted to the Uniform Cost Accounting System reports are taken directly from the NIF Report 605, "Financially Closed Job Orders," one would expect these two reports to have identical bottom lines. In fact the methods for accumulating these two reports are such that the only logical explanation for differences in the reports can be that numbers are lost in translation and mishandling. Since jobs are held open for cost accumulation purposes for forty-five days after work is complete, a job completed in one fiscal year may not get reported in the 7220.29-H reports for that fiscal year, but neither would it make it onto the NIF 605 report for that quarter. As was stated earlier in this thesis, the UCA reporting system is very low priority in the depot since it does not directly nor indirectly impact the NARF. The only differences that could be in the NIF 605 Report and the UCA Report are the result of errors and/or lack of care.

This is not to say that the differences between the fiscal year bottom line cost accumulation and the UCA should be the same. The final costs accumulated over a fiscal year include all costs, including those that are not closed out. The depot uses a system of equivalent units and actual cost accumulation for its actual bottom line for the fiscal year, whereas only closed job orders are used for reporting under the UCA.

E. SUMMARY

The differences found in the Unit Costs in the last column of Exhibit 5-2 are the result of many changes occurring throughout the rate development process. These changes are happening on a continuous basis and as a result the rate used for the unit cost of a particular function in the depot is under constant revision. These rates are used for the budgeting process and eventually are "stabilized" for billing purposes.

The A-11 Budget rates are submitted in April of the year prior to budget execution and therefore are "locked in" about one and a half years prior to the execution period. The Unit Cost of Item (16), Exhibit 5-2, was the unit cost submitted for the FY1984 A-11 Budget. Over a year later the rate was stabilized for billing purposes in August of 1983 (Item (19)). This rate was different due to changes in the Unit Materials, Direct Labor Rate, Overhead and Recoupment. The causes of these individual changes have been discussed in this chapter and result in the overall changes seen throughout the life cycle of a fiscal year rate.

The differences between these rates and the various reporting systems (7220.29-H and Actual Cost Accumulation) are the result of the fact that the rates are under almost constant revision and change. As the deadlines for that rate passes, it becomes "locked in" and the future rates continue to change. The reporting systems are designed to capture different costs and produce different results, with the guidelines on reporting

different. This results in inherent differences between the reporting systems as discussed above.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The purpose of this research, as stated in Chapter I, was to define and compare the methods used for rate development for budgeting and stabilized rate billing purposes and the actual cost accumulation/Uniform Cost Accounting System (DODINST 7220.29-H, Ref. 1) as used in the Naval Aviation depot level maintenance system to accepted cost accounting practices as identified in the accounting literature and the Cost Accounting Standards and Regulations. The vehicle to achieve that has been a field study of the NARF Norfolk accounting systems being used for these purposes. Initial research and expectations indicated that there may be problems within the systems at the depot that were causing inconsistencies in rates. From the first interviews it became apparent that the systems in place at the NARF were compatible with accepted accounting practices and that the causes for the inconsistencies may be due to other factors.

The problems noted in inconsistent rates for billing and budgeting and other inconsistencies in rates for actual cost accumulation versus reported costs under the UCA have been researched and conclusions formulated. The process as used at NARF Norfolk is a theoretically sound system in terms of accepted accounting practices. As explained in the summary of

Chapter V, the numerical differences can be traced to a time factor. The methodology incorporated in rate development as explained in Chapter III relies heavily on historical data and predictions of future states. These future states include inflation factors, facility wage growth, pay increases, different materials source mixes and other factors. Since the rate development process occurs on a continuous basis over a period of two years, the bases used for historical data can change and the predictions for future states are updated. These changes in rate development inputs naturally result in different rates being developed.

The problems associated with inconsistent numerical values of actual cost accumulation and rates used for billing and budgeting are a direct result of using actual costs for accumulation and predicted costs for billing and budgeting.

The reasons for the differences noted in the actual costs accumulated at the depot over a fiscal year and the reported costs under DOD INST 7220.29-H are more subtle. The NARF places very low priority on the reporting requirements of the Uniform Cost Accounting System. This is because it is a totally external reporting system which is not compatible with the accounting systems that are in use at the NARF. Management texts explain the virtues of incentives and the fact that systems expend greater efforts where those efforts are awarded either positive or negative incentives. [Refs. 23,24] The reporting requirements are detailed and require great effort on

behalf of the Comptroller Division personnel in an attempt to comply (there is one Budget Analyst assigned to compare and correct the depot's financially closed job orders report with the quarterly 7220.29-H report). Although the effort is expended, mistakes do occur and the system at the depot does not require extensive checks on this reporting requirement. As stated previously, the 7220.29-H report should match the NIF report which reports financially closed job orders (NIF 605). The apparent reasons that these two reports would be different are mistakes in the translation of numbers from one report to the other. The UCA year-end report will not match the bottom line of the actual costs accumulated for that fiscal year at the NARF because the UCA report does not report any work in process.

B. RECOMMENDATIONS FOR CONTINUED RESEARCH

1. Rate Stabilization

The Rate Stabilization program is not succeeding in its primary goal--to provide a rate for the customer to be able to use in planning his appropriations budget. The customer would have to receive his stabilized rate a full year and a half prior to the fiscal year of execution in order to have this objective satisfied. At present the customer receives the billing rate approximately two to three months prior to the beginning of the fiscal year. Research into this entire program needs to continue. Since the depots are the lowest echelon in the program, the system should be researched at a higher level.

An in-depth study of the program at the NALC level is a starting point, with future studies directed at higher levels (e.g., NAVCOMPT, OASD) in order to begin attempts at a total program revision.

The program is also causing problems for the depots. Since the rates that are submitted by the NARF to NALC a year and a half prior to the fiscal year of execution are revised so thoroughly by upper echelon commands, there is feeling at the depot of decentralization and associated loss of control. The depot budget and comptroller personnel feel that the responsibilities associated with the billing rates are being taken by other, higher echelon commands and this centralization of responsibility is demoralizing to the staff. The NARF no longer controls the amount it may bill its customer and therefore has lost control of the amount of revenue which it may receive for a specified amount of work.

2. DOD INST 7220.29-H

The problems associated with the Uniform Cost Accounting System are many and are being addressed at great length by other research. It should be noted that all interviewees agreed that the idea of a single accounting system to be used throughout the entire DOD depot system is not viable. The inherent differences in the depots in question make total compliance with the instruction an impossibility for all of the depots. The reporting system associated with the UCA has many problems and further research in this area is warranted.

The needs of the depots should be addressed and compared with the needs of the authorities that receive these reports. Management control systems texts discuss these reporting requirements, the characteristics of a good reporting system and the uses of these reports. [Ref. 18] A report which satisfies the needs of these authorities and which is compatible with the depots could be devised in the future.

Since the flow of information starts at the depot and flows up the chain of command, research could be done at the Naval Air Logistics Command level to ascertain what information the NALC and the higher echelons in the chain actually need. This would entail defining the uses of the reported statistics and identifying the end-users of these reports. The accounting system in place at NARF Norfolk is sufficiently flexible to provide almost any statistics that are requested. Once these needs and users are defined, it is absolutely essential that they are communicated down through the entire chain of command so that all of the involved individuals understand the reasons for the reporting requirements. If possible the reports should be combined with already existing management control reports so that they are useful to the depot. This would make the reports more meaningful to management personnel at the NARF and provide an incentive for the depot to spend the effort required to make an accurate report. The implementation of the NAVAIR Industrial Financial Management System throughout the Navy Depot system will simplify the problem by allowing the

reporting system to be easily integrated into the entire depot-level maintenance program. Since the new financial management system is now in the process of being installed, it is an ideal time to closely examine the possibility of an entirely new reporting system.

APPENDIX A

FISCAL YEAR 1984
APPLIED OVERHEAD RATES
EFFECTIVE 1 APRIL 1984
(Breakeven Rates)

30 March 1984

93

NIF Production Overhead Rate	13.757
Stats Production Overhead Rate	0

General Overhead Rate Applicable to Each Direct Hour Excluding NESO & WSM

General Overhead Rate (NIF)	17.197
Stat General Overhead Rate	.239

94

NIF Production Overhead Rate	19.738
Stats Production Overhead Rate	0

95

NIF Production Overhead Rate	11.150
Stats Production Overhead Rate	0

FY 1984

Aircraft Mech
9.84 x 1.291 = $12.70
Electronics Mech
10.29 x 1.291 = $13.28
Sheet Metal Mech
9.84 x 1.291 = $12.70

96

NIF Production Overhead Rate	13.158
Stats Production Overhead Rate	0

WSM - 91

NIF Production Overhead Rate	2.297
Stats Production Overhead Rate	0

NESO - 92

NIF Production Overhead Rate	8.686
Stats Production Overhead Rate	0

amtDMC72/40

Source: Reference 7

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